Milli-Q® Direct Water Purification System

Pure & ultrapure water directly from tap water

EMD Millipore is a division of Merck KGaA, Darmstadt, Germany

Pure & ultrapure water from a single water system

Scientists' needs:

Scientists need a system that can deliver pure and ultrapure water directly from tap water at the right price:
- meeting increasing quality standards
- providing convenience
- optimizing lab space
- allowing low running costs

The Milli-Q® Direct answer:

The Milli-Q® Direct is designed as a single water system which produces pure and ultrapure water directly from tap water. The system:
- exceeds the requirements of the most demanding norms
- provides manual and volumetric water dispense at low and high flow rate
- has a low footprint: wall-or bench-integrated installation
- allows optimized global costs

Optimum water production

Pure water

Tap water is first purified to pure (Type 3) water by reverse osmosis (RO) using techniques designed and optimized by EMD Millipore:
- Progard® pretreatment cartridge validated to extend the lifetime of the RO cartridge.
- Reject recirculation loop that recycles reject water treated by the Progard® to minimize tap water usage (recovery up to 66 %)* and extend Progard® lifetime while avoiding fouling or scaling issues that might shorten the RO cartridge lifetime.
- Unique system adaptation to feed water temperature in order to avoid flow rate decrease during the wintertime when tap water is colder.
- Unique safety device ensuring that only low ionic permeate water will be sent to the tank in order to warrant adequate pure water quality and to increase the lifetime of the ion-exchange cartridge used to produce ultrapure water.
- Complete process monitoring system that systematically checks water temperature, pressure, conductivity and RO rejection using calibrated meters at different steps.

The pure water produced by reverse osmosis is stored in a tank designed to minimize risks of contamination during water storage. EMD Millipore's tank level sensor will allow the system to automatically start or stop producing water when you want to and will accurately display the tank's water level on the system's screen. Safety devices prevent overflow or the system from running dry.

From the reservoir, water can be sourced though a front valve, sent by a delivery pump to feed instruments such as a glassware washing machine, or further processed by the Milli-Q® Direct to produce ultrapure (Type1) water.

Ultrapure water

- Water is purified in a first step using unique Jetpore® ion-exchange resin, synthetic activated carbon and a UV lamp emitting at 185 and 254 nm to reach a resistivity of 18.2 MΩ.cm at 25° and a TOC value below 5 ppb; both values are monitored by advanced analytical techniques.
- This water is sent through a small recirculation loop to the Application Pak, where a final purification step, critical for specific expriments, removes contaminants just before water leaves the system.

*depending on feed water quality

Convenience in water delivery:

Easily prepare solutions with the low flow function to precisely adjust the meniscus in volumetric flasks.

The 75 cm long tubing reaches the sink for easy glassware washing at mid or high flow (up to 2 l per mn).

Save time with the volumetric function automatically delivering the water volume you need, and the dispensing arm designed to fit the height and shape of all laboratory glassware.

Deliver water hands-free using the footswitch option for more convenience.

Select an Application Pak to get the best adapted media for your research: BioPak®, VOC-Pak™, EDS-Pak®, LC-Pak™, Millipak® polishers.

BioPak® Polisher

Pyrogen-free and nuclease-free water

Catalogue N°:
CDUFBI001

VOC-Pak™ Polisher

Water for volatile organic compounds analysis

Catalogue N°:
VOCPAK001

EDS-Pak® Polisher

Water for endocrine disrupters experiments

Catalogue N°:
EDSPAK001

LC-Pak™ Polisher

Water for ultratrace organic analysis

Catalogue N°:
LCPAK0001

Millipak® Polisher

Bacteria-free and particulate-free water

Catalogue N°:
MPGP04001

Milli-Q® Direct System at a glance

Dispenser removable from support

Application Pak adapted to specific contaminants removal

Consistent delivery of Ultrapure quality water adapted to your needs at low or high flow rate

Dispenser on support adapted to glassware height and shape for automatic volume delivery

Built-in UV 185 nm lamp for TOC reduction & measure

High recovery Reverse Osmosis for pure water production at low cost

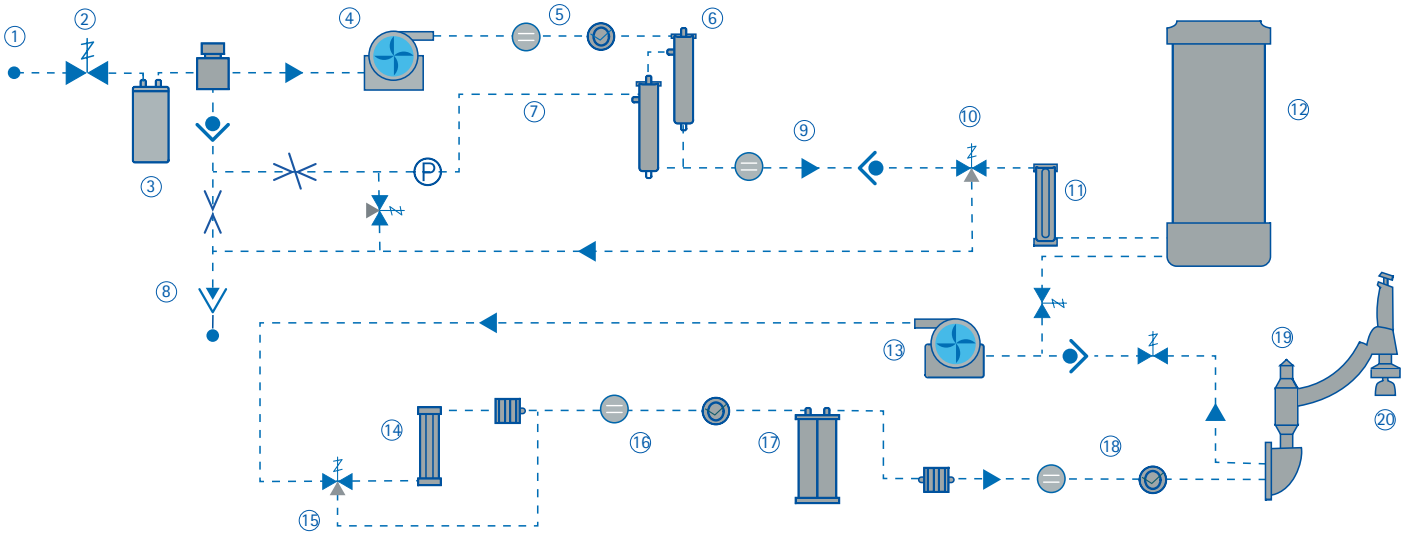
Large digital & graphic screen with detailed procedures for full online support

Progard® pretreatment cartridge to increase RO module lifetime – with RFID tag for safety & traceability

Q-Pak® polishing cartridge adapted to general application – with RFID tag for safety & traceability

Quick Reference Guide with all needed information in left door

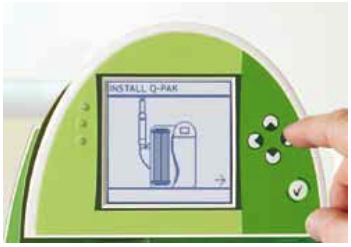
Inside the Milli-Q® Direct



1. Tap water feed
2. Inlet Solenoid Valve
3. Progard® pretreatment pack
4. Booster pump
5. Measure of feed water conductivity and temperature
6. Reverse Osmosis cartridge(s)
7. RO reject recovery loop
8. Drain
9. Permeate conductivity cell
10. 3-way solenoid valve
11. UV lamp 254 nm (optional)
12. Tank for Type 3 water storage
13. Recirculation & delivery pump
14. UV lamp 185 nm
15. 3-way solenoid valve – part of the TOC indicator
16. Resistivity & temperature measure for ultrapure water TOC indicator
17. Q-Pak® polishing cartridge
18. Ultrapure water resistivity and temperature measure
19. Ultrapure water dispenser
20. Application Pak polisher adapted to application

Easy access to information

- Simplified and detailed information in (local language).
- Alerts & alarms (which can be enhanced by a buzzer) are visible on the system's main screen, with complete information on actions required accessible at the touch of a finger.
- Sensors regularly monitor the operation of the system to ensure it operates within specifications. For instance, if ionic contamination of feed water exceeds specifications, causing high conductivity, the built-in Feed Water Conductivity Meter will trigger an alarm to alert you.



- Clear graphics help you perform specific tasks such as maintenance. From the same screen, you can even print reports on the system's water quality and history.

- Critical information such as set points or units is accessible only to the designated responsible user and is protected by a login and a password.
- Automatically stop ultrapure water dispense after a fixed time period set by the user, in order to avoid water loss or lab flooding.

A Quick Reference Guide located in the door of the Milli-Q® Direct water system provides all the information required to understand the operation and maintenance of the system.

The system comes with a complete and detailed user manual in 8 languages on CD-ROM. A printed manual contains essential information in (local language).

Easy and reduced maintenance

Maintenance frequency is minimal, and the procedures are simplified.

Progard® Pack replacement

Q-Pak® polishing cartridge replacement

Millipak® Express 40 replacement

- Progard® pretreatment pack or the Q-Pak® polishing cartridge replacement takes less than 5 minutes.
- Quick and easy traceability thanks to RFID tag which automatically registers the catalog and other new consumables in the system's memory.
- The system will alert you to replace consumables or schedule service visits at least 15 days before maintenance is actually required.

Service

EMD Millipore provides a comprehensive range of service programs performed by certified EMD Millipore field service support engineers to thoroughly maintain and qualify your Milli-Q® system for full compliance with your industry's regulatory standards.

The service program portfolio covers all maintenance requirements such as installation, customized user training, scientific and technical support, troubleshooting, preventive maintenance visits, and all validation requirements using ad hoc calibrated equipment, procedures, workbooks and suitability tests within a GXPs environment.

Safety

The Milli-Q® Direct system is tested by an independent and accredited company for compliance with the CE directives related to safety and electromagnetic compatibility.
A certicate is delivered with the system and the report can be consulted on request at the manufacturing site.
The Milli-Q® Direct system is built using components and practices recommended by UL and has been cUL marked. The registration can be verified on the UL web site (http://www.ul.com).

Certification

The Milli-Q® Direct system is delivered with a Certificate of Conformity ensuring that it has been built and tested fully assembled following EMD Millipore Standard Operating Procedures, and a Certificate of Calibration for the temperature and resistivity meters built in the system. The Milli-Q® Direct consumables are automatically delivered with a Certificate of Quality.
EMD Millipore's manufacturing site is ISO 9001 v.2000 and ISO 140001 certified.

MILLI-Q® DIRECT SPECIFICATIONS

Feed Water Specifications

Parameter	Value & Unit
Feed water quality	Potable Tap Water Feed
Feed Water Conductivity	< 2000 µS/cm at 25°C
Feed Water TOC	< 2000 ppb
Feed Water Pressure	1 – 6 bar
Feed Water Temperature	5 – 35 °C
Feed Water Chlorine	< 3 ppm(*)
Feed Water Fouling Index	< 12
Feed water pH	4 to 10 pH units
Feed Water Connection	1/2 in Gaz M

(*) Feed Water Chlorine < 1ppm with Progard® T3 and < 3ppm with Progard® T3 + Prepak 1

Type 1 Product Water Quality

Parameter	Value & Unit
Resistivity*	18.2 MΩ.cm at 25 °C
TOC**	≤ 5 ppb (µg/l)
Bacteria ***	< 0.1 cfu/ml
Pyrogens (endotoxins)****	< 0.001 EU/ml (pyrogen-free)
RNases****	< 0.01 ng/ml (RNase-free)
DNases****	< 4 pg/µl (DNase-free)

* Resistivity can be displayed temperature-compensated at 25 °C or non-temperature-compensated as required by USP

** TOC specs – Test Conditions: Milli-Q® Direct System equipped with Progard® T3 pretreatment pack and Q-Pak® TEX polishing cartridge and with feed (tap) water quality within specifications. Product water quality may vary due to local feed water conditions.

*** Results with Millipak® express 40 or BioPak® final polisher in place

**** Results with BioPak® final polisher in place

Type 1 Water Delivery

Parameter	Value & Unit
Manual dispense flow rate	Adjustable between 50 and 2000 ml/min
Automatic dispense volume	100 ml, then 250 ml to 5 l by 250 ml increments 5 l to 60 l by 1 l increments
Volumetric dispense accuracy	3% for volumes between 250 ml and 60 l
Volumetric dispense dispersion	CV < 3% for volumes between 250 ml and 60 l

Type 3 Water Quality

Parameter	Value & Unit
Ions rejection	97 to 98% with new RO cartridge
Organics Rejection	> 99% for MW > 200 Dalton
Particulates & Bacteria Rejection	> 99%

Type 3 Water production and delivery

Parameter	Value & Unit
Production Flow Rate	8 l/hour (Milli-Q® Direct 8) 16 l/hour (Milli-Q® Direct 16)
Delivery Flow rate	From tap: up to 2.5 l/min From optional pump: up to 15 l/min at 1 bar

Milli-Q® Direct System Dimensions

Parameter	Value & Unit
System footprint	1606 cm² (249 in²)
System height • Cabinet (base) • Dispenser arm (top)	 497 mm (19.56 in) 713 mm (28.07 in)
System width • Cabinet (base) • Dispenser arm (top)	 332 mm (13.07 in) 413 mm (16.25 in)
System depth • Cabinet (base) • Dispenser arm (top)	 484 mm (19.05 in) 581 mm (22.87 in)
System weight (packaged) 8/16	24/25 kg (52.91/55.11 lb)
System weight (empty) 8/16	20/21 kg (44.09/46.29 lb)
System weight (with water) 8/16	27/28 kg (59.52/61.73 lb)
Dispenser delivery loop length	750 mm (29.52 in)
Electrical power supply cable length	290 cm (114.1 in)
Electrical power supply voltage	100 – 230 V ± 10 %
Electrical power supply frequency	50 – 60 Hz ± 10 %
Feed water connection	1/2 in. Gaz F
Data connection	Ethernet (RJ45)

Q-POD ® Accessory Dimensions

Parameter	Value & Unit
Q-POD® height	579 mm (23.50 in)
Q-POD® diameter	230 mm (9.05 in)
Dispenser delivery loop length	800 mm (31.49 in)
Q-POD® weight (packaged)	7.2 kg (15.87 lb)
Q-POD® weight (empty)	5 kg (11.02 lb)
Q-POD® weight (with water)	5.5 kg (12.12 lb)
Loop & cable to system length	290 cm (114.1 in)
Data connection Parallel Port	(25-pinD-Sub) for print-out

A report on conformity of Milli-Q® Direct water quality with Type 1 water quality as described by ASTM®, ISO® 3696 and CLSI® norms and to Purified Water as described in USP and EP is available upon request.

ACCESSORIES

Customize your Milli-Q® Direct system to meet your specific needs.

Reservoirs

- Select from the range of EMD Millipore tanks from 30 l to 350 l designed for optimum pure water storage.

Q-POD® Dispenser: Ultrapure water delivery at your fingertips

- Save your bench space by removing the arm and dispenser from the Milli-Q® Direct system and mounting it on the Q-POD® support.

Q-POD® dispenser key features:

- Variable water flow (slow flow to 2 l/min) controlled by plunger.
- Volumetric water delivery controlled from the Q-POD® base.
- Designed to accommodate all sizes of glassware – 250 ml cylinder, 5 l flask or even a 30 l carboy.
- Graphic display shows at a glance the water quality specifications and all critical information you need (resistivity, TOC level, alerts, alarms, etc.).
- Printer connection to instantly record water quality history.

Wall Mounting Bracket

- Save space by installing the Milli-Q® Direct on the wall or under the bench.

Milli-Q® Direct with Wall Mounting Bracket and Q-POD®

Protectors:

- Water Sensor – placed on the floor, this sensor stops water feed to the system if there is water on the floor.
- Tank Level Sensor – transfers tank level information to the system to start & stop pure water production at levels selected by the user. A safety level prevents air from entering the ultrapure water part when the tank is empty.
- Silicone Cover to protect your Q-POD® from harsh chemicals, such as strong acid & bases, aggressive solvents or etchants.
- UV lamp 254 nm: installed upstream from the inlet to the tank, this optional UV lamp allows reduction of the level of bacteria in the permeate water by a factor of 1000.

Footswitch

- Connect the footswitch to the base of the Q-POD® dispenser or directly to the Milli-Q® system for hands-free water delivery: press once to start and once to stop.

For more information, please visit our website:
www.millipore.com/labwater

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